RAIN EVENT NARRATIVE

As a supplement to the 2004-2006 USEPA Remedial Investigation (RI) sampling program, Malcolm Pirnie, Inc. collected large volume water column samples and sediment trap samples during four high-flow storm events between January 11, 2008 and March 8, 2008.[1] Samples were designed to characterize suspended solids transported during storm events to the Lower Passaic River from Upper Passaic River, tributaries of the Lower Passaic River (Second River, Third River, and Saddle River), combined sewer overflow (CSO) sites, and stormwater outfall (SWO) sites. The following narrative summarizes the collected samples and requested analyses for this program. Due to different sample matrices, analytical results for the water column samples are available on the project database under the survey identification number 20010.

Field work was conducted in accordance with the Lower Passaic River Restoration Project Work Plan (Malcolm Pirnie, Inc., January 2006) and the Lower Passaic River Restoration Project Quality Assurance Project Plan (QAPP; Malcolm Pirnie, Inc., August 2005) and its accompanying addendum (dated December 2007). However, some sampling techniques required field adjustments to accommodate field conditions. Deviations from the QAPP/FPS Addendum included: (1) collection of whole water samples for laboratory filtering and grain-size determinations, and (2) trials of field filtering using QMA filters for metals analyses. Note that the QAPP/FSP Addendum was further amended on December 19, 2007 to include the deployment of sediment traps over multiple rain events to obtain solids settling out of the water column.

SUMMARY OF RAIN EVENT PROGRAM

To meet the data needs and objectives described in the QAPP/FPS Addendum, the following steps were implemented to conduct the Rain Event Program:

- Reconnaissance to identify potential SWO and CSO sampling locations.
- Monitor the precipitation forecast and mobilize if the approaching storm was classified as a high-flow storm event.
- Collect large volume whole water column samples on tributaries, CSOs, and SWOs.
- Ship whole water samples to laboratories for filtering and analyze contaminant concentrations on suspended solids.
- Collected solids transported on tributaries during high-flow storm events using sediment traps.
- Ship sediment samples to laboratories for analysis.

DETAILS OF THE RAIN EVENT MONITORING

Precipitation forecast monitoring was conducted at least daily and increased to hourly monitoring once a potential high-flow storm event began approaching the Lower Passaic River Study Area (usually 24 to 48 hours before the forecasted arrival of the storm). The National Weather Service website (www.weather.gov) Hourly Weather Graph, maintained by the National Oceanic and Atmospheric Administration (NOAA), was the primary source used by Malcolm Pirnie, Inc. to monitor the approaching storm. This

[1] As part of the 2007-2008 field work, core top samples and low resolution sediment cores were also collected. These samples are described in a separate narrative and are available in the project database under survey identification number 20001.

website also provided the current conditions for Newark, New Jersey and recorded the accumulated precipitation for various time intervals. Additional references included the Weather Channel (www.weather.com) and Accuweather (www.accuweather.com) websites as well as the real-time monitoring of stream gages through the United States Geological Survey (USGS) website.

Rain events were classified as a high-flow storm event if 0.5 inches of rain was forecasted over a short duration. This criterion was used as a guide for mobilizing the field crews in conjunction with real-time data and communications with the Passaic Valley Sewerage Commissioners (PVSC) plant operators.

DETAILS OF THE SWO AND CSO SAMPLING PROGRAM

Prior to SWO sampling, a reconnaissance of potential SWO sampling locations was conducted. SWO sites exposed at low tide[2] on the Lower Passaic River were photographed and mapped using a hand-held global positioning system (GPS) device. Township Engineers and other department officials were then contacted by phone to discuss mapped locations and identify other possible outfalls that represented significant aerial coverage. SWO samples were collected at the following locations during the four rain events (Table 1 and Figure 1). This information is also available in the Comments field in the *dbo_Samples* table in the database.

Table 1: SWO Sampling Locations and Sample Identification Numbers

Storm Event Date	SWO Sampling Location	Sample Identification Number in Database
January 11, 2008	Lyndhurst - Copeland and Riverside Avenue	LPRP-LVCG-PSR-000410
	Lyndhurst - Riverside County Park	LPRP-LVCG-PSR-000412
	Lyndhurst - Tontine and Riverside Avenue	LPRP-LVCG-PSR-000409
	North Arlington - River Road and Crystal Street	LPRP-LVCG-PSR-000414
	Nutley - Park Avenue Bridge	LPRP-LVCG-PSR-000411
February 1, 2008	Belleville - Little Street and Davidson Street	LPRP-LVCG-PSR-000417
	Lyndhurst - Copeland and Riverside Avenue	LPRP-LVCG-PSR-000419
	Lyndhurst - Riverside County Park	LPRP-LVCG-PSR-000416
	Lyndhurst - Tontine and Riverside Avenue	LPRP-LVCG-PSR-000421
	Nutley - Park Avenue Bridge	LPRP-LVCG-PSR-000413**
February 13, 2008	Belleville - Little Street and Davidson Street	LPRP-LVCG-PSR-000418
	Nutley - Park Avenue Bridge	LPRP-LVCG-PSR-000425
	Lyndhurst - Copeland and Riverside Avenue	LPRP-LVCG-PSR-000426
	Lyndhurst - Riverside County Park	LPRP-LVCG-PSR-000427
March 8, 2008	Belleville - Little Street and Davidson Street	LPRP-LVCG-PSR-000428
	Kearny - Johnston Street	LPRP-LVCG-PSR-000432
	Newark – Blanchard Street	LPRP-LVCG-PSR-000429

** Duplicate samples collected (LPRP-LVCG-PSR-000420)

Potential CSO sampling locations were identified using regulator engineering drawings, flow rate tables, and land use tables that were made available by PVSC. Selected CSO sampling locations were located in Newark, New Jersey with only one identified in Kearny, New Jersey. No CSO sites are known to exist in the other communities along

[2] SWO sites were located below the high tide level. Consequently, as the water level changes from low tide to high tide, river water can flow back into the SWO outfall pipe.

the Lower Passaic River. A field reconnaissance of these potential CSO sampling locations was then conducted with personnel from PVSC. At each location the configuration of the CSO regulator box, location of the tide gates, position of the regulator dam, and locations to view flow and to collect samples were identified. (PVSC personnel opened manholes as needed.) As a result of the field reconnaissance, seven CSO sites in Newark, New Jersey were selected for sampling, including, Clay Street CSO, City Dock CSO, Fourth Avenue CSO, Freeman Street CSO, Jackson Street CSO, Saybrook Place/Rector Street CSO , and Verona Avenue CSO. However, no water samples were collected from Jackson Street CSO or City Dock CSO since no discharge flow was observed during the sampled high-flow storm events.

Malcolm Pirnie, Inc. communicated regularly with the plant operators during storm events and was notified when the regulator boxes were closed by PVSC and CSO sampling could occur. CSO samples were collected at the following locations during the four rain events (Table 2 and Figure 1). This information is also available in the Comments field in the *dbo_Samples* table in the database. Due to the timing of the January 11, 2008 rainfall with the closing of the tide gates, no discharge flow from the CSOs was observed even though the regulator boxes were closed and the internal dam was submerged.

Table 2: CSO Sampling Locations and Sample Identification Numbers

Storm Event Date	CSO Sampling Location	Sample Identification Number in Database
February 1, 2008	Clay Street CSO	LPRP-LVCG-PSR-000399
	Fourth Avenue CSO	LPRP-LVCG-PSR-000402
	Saybrook Place/Rector Street CSO	LPRP-LVCG-PSR-000401
	Verona Ave CSO	LPRP-LVCG-PSR-000400
February 13, 2008	Clay Street CSO	LPRP-LVCG-PSR-000406
	Fourth Avenue CSO	LPRP-LVCG-PSR-000423
	Freeman Street CSO	LPRP-LVCG-PSR-000403
	Saybrook Place/Rector Street CSO	LPRP-LVCG-PSR-000424
	Verona Ave CSO	LPRP-LVCG-PSR-000405
March 8, 2008	Clay Street CSO	LPRP-LVCG-PSR-000433
	Fourth Avenue CSO	LPRP-LVCG-PSR-000434
	Freeman Street CSO	LPRP-LVCG-PSR-000435
	Saybrook Place/Rector Street CSO	LPRP-LVCG-PSR-000404

** Duplicate samples collected (LPRP-LVCG-PSR-000407)

While the QAPP/FSP Addendumrecommended field-filtering water samples, SWOs and CSOs were observed during field reconnaissance to respond quite rapidly to intermittent rain events and discharges diminished quite rapidly after the rainfall ceased. Consequently, instead of field filtering, large volume whole water samples were collected and shipped to the laboratory for filtering. Whole water CSO/SWO samples were collected using a peristaltic pump. Depending on the location, SWO samples were collected through a storm grate, by removing a manhole cover, or from the concrete discharge pipe. SWO samples were collected by securing Teflon-lined intake tubing to a rigid rod, which was inserted into the SWO stream. The intake tubing was maintained at a height above the bottom of the pipe or manhole to prevent the collection of solids that may have accumulated at the pipe bottom. For CSO sampling, the intake of the tube was

positioned 1-foot from the bottom of the CSO regulator box, downstream of the internal dam, when possible. The intake tubing was positioned to prevent the collection of solids that had accumulated within the sand catcher of the regulator box. To ensure that all sample bottles represented a time-integrated CSO/SWO sample (thus accounting for variation in flow), bottles were filled approximately one-tenth to one-fifth of the volume in succession until bottles were full.

DETAILS OF TRIBUTARY WATER COLUMN SAMPLING PROGRAM

As part of the rain event program, Malcolm Pirnie, Inc. collected suspended solids samples, whole water column samples, and sediment trap samples on Second River, Third River, Saddle River, and Ackerman Avenue Bridge.

- **Second River:** Tributary samples were collected during rainfall events at the head-of-tide in the vicinity of the previously occupied semi-permeable membrane (SPMD) sampling location, which is adjacent to the former USGS Second River gage. For protection of the field crew from the elements, the suspended solids and whole water samples were collected approximately 200 yards downstream under a railroad viaduct.
- **Third River:** Tributary samples were collected during rainfall events at the head-of-tide location in the vicinity of the previously occupied SPMD sampling location, which is adjacent to the existing USGS Third River gage. This gage is not calibrated and is only used by USGS as an indicator for potential flooding.
- **Saddle River:** Tributary samples were collected during rainfall events at the head-of-tide location in the vicinity of the previously occupied SPMD sampling location, which is adjacent to the existing USGS Saddle River gage.
- **Ackerman Avenue Bridge:** Samples were collected during rainfall events on the Lower Passaic River in the vicinity of the previously occupied SPMD sampling location, which is between the Dundee Dam [at river mile (RM) 17.4 and the Ackerman Avenue Bridge (RM17)]. Water conditions at this location represent flow entering the Lower Passaic River from the Upper Passaic River. No USGS gage exists at this location.

During the January 11, 2008 and February 1, 2008 high-flow storm events, Malcolm Pirnie, Inc. collected water column samples from these four tributary locations. Table 3 summarizes the sample identification numbers from these storms.

Table 3: Tributary Sampling Locations and Sample Identification Numbers

Storm Event Date	Tributary Sampling Location	Sample Identification Number in Database
January 11, 2008	Saddle River	LPRP-LVCG-SDR-000001
	Second River	LPRP-LVCG-SCR-000003
	Third River	LPRP-LVCG-THR-000002
	Ackerman Avenue Bridge	LPRP-LVCG-DDL-000004
February 1, 2008	Saddle River	LPRP-LVCG-SDR-000002 **
	Second River	LPRP-LVCG-SCR-000004
	Third River	LPRP-LVCG-THR-000003
	Ackerman Avenue Bridge	LPRP-LVCG-DDL-000006

**Duplicate sample LPRP-LVCG-DDL-000003.

Field-filtering of large volume water column samples was performed by Malcolm Pirnie, Inc. using a Trace Organic Platform Sampler (TOPS).[3] A Teflon-lined sample tube was secured to a rod and the tubing intake was placed about one-foot above the sediment bottom of the tributary. Suspended solids in the water column were collected on a 0.5 µm glass wound fiber filter followed with a 0.7 µm (142 mm diameter) flat glass fiber filter. The total flow through the filters was measured with a graduated cylinder. The flat filters were changed out as they clogged; thereby resulting in multiple flat filters being used during the filtering process. The suspended solids collected on the filters were analyzed by the laboratory; the filtrate was discarded. The water remaining in the filter chamber was also collected and analyzed by the laboratory. Field parameters for the TOPS field-filtration are provided in Attachment A.

During the January 11, 2008 storm, field filtering using QMA filter housings fitted with a 0.45 µm (42 mm diameter) filter was attempted at tributary locations. However, this procedure did not work adequately since it took extremely long to filter less than 80 milliliters of sample. Consequently, for this storm event, QMA filters plus one 4-liter whole water samples, were shipped to the laboratory for analysis. For future storms, only whole water samples were collected for laboratory QMA filtration. Whole water samples were collected by using either the TOPS peristaltic pump (diverting the flow just prior to the filters) or by using a dedicated peristaltic pump to fill the sample jars.

In addition to the water column samples, sediment traps were also deployed on the tributaries. These traps were designed to collect recently depositing solids on tributaries that exhibited extremely low amounts of suspended solids during periods of low flow (non-rain events). Traps were constructed of four to six tubes (Figure 2). Each of the two-foot long sediment trap tubes had a slot cut along the top of the tube from end to end. A small spacer remained approximately every foot to keep the tube from collapsing on itself. A lattice was constructed, and the tubes were affixed to it. The lattice was deployed into the tributary bottom with the tube slots facing upward. Each lattice was attached to a safety line that was staked at the shore. The lattice was also held down using rocks, where necessary. Due to the extremely high flow rates through the Second River channel, the lattice was also staked directly to the river bottom. This security was necessary after a set of sediment traps was washed away, also breaking the rope used as a safety line.

The sediment traps were deployed for a few weeks in the tributaries over the course of a few rainfall events. Sediment trap were deployed three times between December 2007 and March 2008. The first deployment extended from December 27, 2007 to January 16, 2008; the second deployment extended from January 17, 2008 to February 7, 2008; and the third deployment extended from February 20, 2008 to March 10, 2008. They were inspected regularly until a sufficient volume of sediment had accumulated in each of the traps. The traps were retrieved and the sediment in the tubes was placed into a decontaminated glass jar and allowed to settle overnight (Figure 2). The following day

[3] Refer to the Large Volume Water Column Narrative for more information on TOPS and sampling techniques.

the water was decanted from the jar, the sediment was thoroughly mixed, and the sample jars were filled with the sediment. Table 4 summarizes these deployments. This information is also available in the Comments field in the *dbo_Samples* table in the database.

Table 4: Sediment Trap Deployments and Sample Identification Numbers

Collection Dates	Tributary	Field Location Name	Sample Identification Number in Database
January 16, 2008	Saddle River	SDR SedTrap#1	LPRP-SCSH-SDR-000001
	Second River	SCR SedTrap#1	LPRP-SCSH-SCR-000001
	Third River	THR SedTrap#1	LPRP-SCSH-THR-000001
	Ackerman Avenue Bridge	PSR SedTrap#1	LPRP-SCSH-PSR-001607
February 7, 2008	Saddle River	SDR SedTrap#2	LPRP-SCSH-SDR-000007
	Second River	SCR SedTrap#2	LPRP-SCSH-SCR-000004
	Third River	THR SedTrap#2	LPRP-SCSH-THR-000006
	Ackerman Avenue Bridge	PSR SedTrap#2	LPRP-SCSH-PSR-001663
March 10, 2008	Second River	SCR SedTrap#3	LPRP-SCSH-SCR-000005
	Second River (Bedload)	SCR Bedload	LPRP-SCSH-SCR-000006

DETAILS ON LABORATORY ANALYSIS

Sample bottles and filtering methods for CSO/SWO and tributary samples are presented in Table 5. Suspended solids collected by field filtration or laboratory filtration were analyzed for polychlorodibenzodioxin/furan (PCDD/F), polychlorinated biphenyl (PCB) congeners, polycyclic aromatic hydrocarbon (PAH), and pesticide by Axys Analytical Services (British Columbia, Canada); metals and total suspended solids (TSS) by Brooks Rand (Seattle, Washington); grain size by GeoSea Consulting (British Columbia, Canada); and particulate organic carbon (POC) and TSS by Accutest Laboratories (Dayton, New Jersey). Note that TSS was measured by two laboratories using two different methods. Brooks Rand reported TSS collected on a QMA filter to correspond to the metals analyses, which were also analyzed using a QMA filtering method. Accutest Laboratories reported TSS using the USEPA Method 160.1.

Table 5: Laboratory and Shipment Information for CSO/SWO and Tributary Samples

Analysis	Sample Bottle	Filtering Method	Laboratory
PCDD/F, PCB, PAH, and Pesticides	Five 4-liter amber bottles	Laboratory-filtration: Glass Fiber Wound Filter	Axys Analytical Services
PCDD/F, PCB, PAH, and Pesticides	TOPS cartridge, flat filters, and housing water	Field-filteration: TOPS	Axys Analytical Services
Metals and TSS	One 4-liter plastic bottle and one 1-liter bottle	Laboratory-filtration: QMA Filter	Brooks Rand
Grain Size [a]	Four gallons – decanted water and ship one half-gallon	No filtering (modified ASTM 4464 Method - laser light scatter)	GeoSea Consulting
POC and TSS	One 4-liter bottle	Laboratory-filtration: USEPA Method 160.1	Accutest Laboratories

a: Four gallons of whole water were collected at each SWO/CSO location. Solids were allowed to settle over a 2-day to 3-day period. Water was decanted and remaining suspended solution from the four sampling bottles was combined into one half-gallon bottle for shipment.

Sediment trap samples were analyzed for PCDD/F, PCB congeners, PAH compounds, and pesticide by Axys Analytical Services (British Columbia, Canada); metals and total organic carbon (TOC) by Accutest Laboratories (Dayton, New Jersey); grain size by GeoSea Consulting (British Columbia, Canada); and radiological parameters, including cesium-137, beryllium-7, and potassium-40, by Renseselaer Polytechnic Institute (Troy, New York).

The following itemized list describes samples and deviations that occurred during the Rain Event Program:

- A trial run was conducted on December 17, 2007 and involved the collection of one sample from Ackerman Avenue Bridge (LPRP-LVCG-DDL-000001). This sample was only analyzed for TSS by USEPA Method 160.1.
- During the January 11, 2008 storm, only one 4-liter bottle was shipped to Brooks Rand for metals and TSS analyses. However, for two SWO samples (LPRP-LVCG-PSR-000410 and LPRP-LVCG-PSR-000414), the entire whole water sample was used for the metals analysis. Corrective action included the shipment of a separate 1-liter bottle to Brooks Rand dedicated to TSS analysis.
- During the January 11, 2008 storm, four 1-liter TSS bottles were shipped to Accutest Laboratories. These bottles were filled to the top one bottle after another. However, this sampling approach did not account for time variation in suspended solids. Consequently, the sampling procedure was changed to one 4-liter bottle, which was filled throughout the sample collection to represent a time-integrated sample. Note that on Second River on January 11, 2008, a second 1-liter TSS bottle was collected (LPRP-LVCG-SCR-000006) to characterize the change in TSS during the storm.
- During the January 1, 2008 storm, field QMA filtration was attempted. For this storm only, QMA filters plus whole water samples were collected and shipped to the laboratory. This procedure allowed for a comparison of suspended solids collected by laboratory-filtration and field-filtration. The results indicated no difference between the two sampling procedures. Consequently, future sampling efforts only involved the collection of whole water samples designated for laboratory QMA filtration. Consequently, no data are available for TSS by QMA method for LPRP-LVCG-PSR-000409, LPRP-LVCG-PSR-000410, LPRP-LVCG-PSR-000411, LPRP-LVCG-PSR-000412, and LPRP-LVCG-PSR-000414.
- During the February 1, 2008 storm, several bottles broke during shipment to Axys Analytical Services laboratory. Organic analyses were completed on the remaining intact bottles. LPRP-LVCG-PSR-000413: analysis conducted on 16 liters, LPRP-LVCG-PSR-000416: analysis conducted on 16 liters, LPRP-LVCG-PSR-000419: analysis conducted on 12 liters, LPRP-LVCG-PSR-000420: analysis conducted on 8 liters, and LPRP-LVCG-PSR-000401: analysis conducted on 16 liters.
- During the February 1, 2008 storm, a duplicate sample was collected at Saddle River (Parent sample: LPRP-LVCG-SDR-000002, Duplicate sample: LPRP-LVCG-DDL-000003). However, a duplicate TOPS sample was not collected.
- Axys Analytical Services evaporated two extracts: LPRP-LVCG-PSR-000419 and LPRP-LVCG-PSR-000412. Consequently, these two samples only have PAH analysis reported.

- GeoSea Consulting performed the modified ASTM 4464 Method - laser light scatter on the whole water samples as received from the field during the January 11, 2008 storm. However, during the February 1, 2008 storm, coarse material in sample LPRP-LVCG-PSR-000420 clogged the instrument valve. GeoSea Consulting drained the instrument, sieved the extracted sample through a 1millimeter (mm) sieve, and then re-analyzed. The remaining samples from the February 1, 2008 storm (including LPRP-LVCG-PSR-000413, LPRP-LVCG-PSR-000416, LPRP-LVCG-PSR-000400, and LPRP-LVCG-PSR-000402) plus all other samples from future storms were first sieved before analyzed.
- For the QMA laboratory filtration procedure, Brooks Rand set up two parallel filtration apparatuses to form duplicate QMA filters for each 4-liter whole water sample. Brooks Rand then digested the QMA filter with nitric acid and hydrochloric acid and analyzed the suspended solids. However, this method interfered with the quantification of some metals. A more mild acid digestion method was developed by eliminating the hydrochloric acid. Duplicate filters were then analyzed and the metals quantified. Due to limited suspended solid mass, duplicate filters were not available for the following samples (consequently, the data reflects the results from the original nitric acid/hydrochloric acid digestion): January 11 storm LPRP-LVCG-PSR-000411, February 1 storm LPRP-LVCG-PSR-000399, February 13 storm LPRP-LVCG-PSR-000406, and the rinse blanks (LPRP-RINS-ATE-000034, LPRP-RINS-ATE-000035, LPRP-RINS-ATE-000036, and LPRP-RINS-ATE-000037).
- During the first deployment, sediment trap samples on the Second River (LPRP-SCSH-SCR-000001) and Ackerman Avenue Bridge (LPRP-SCSH-PSR-001607) were not submitted for radiological analyses due to limited sediment mass.
- During the third deployment, a sediment trap was positioned in the main channel of Second River (LPRP-SCSH-SCR-000006) to collect coarse-grained material to characterize the tributary bedload.

Where appropriate, field parameter are provided in Attachment A and listed in the Comments field in the *dbo_Samples* table in the database. At the time that this narrative was written, the grain size data were not available on the project database. However, the data package (as received) from GeoSea Consulting is available in the project database download as a separate zip-file.

US Army Corps of Engineers

CSO, SWO, Sediment Trap, and Tributary Samples Location for the Water Column Program

Lower Passaic River Restoration Project

Figure 1a

November 2008

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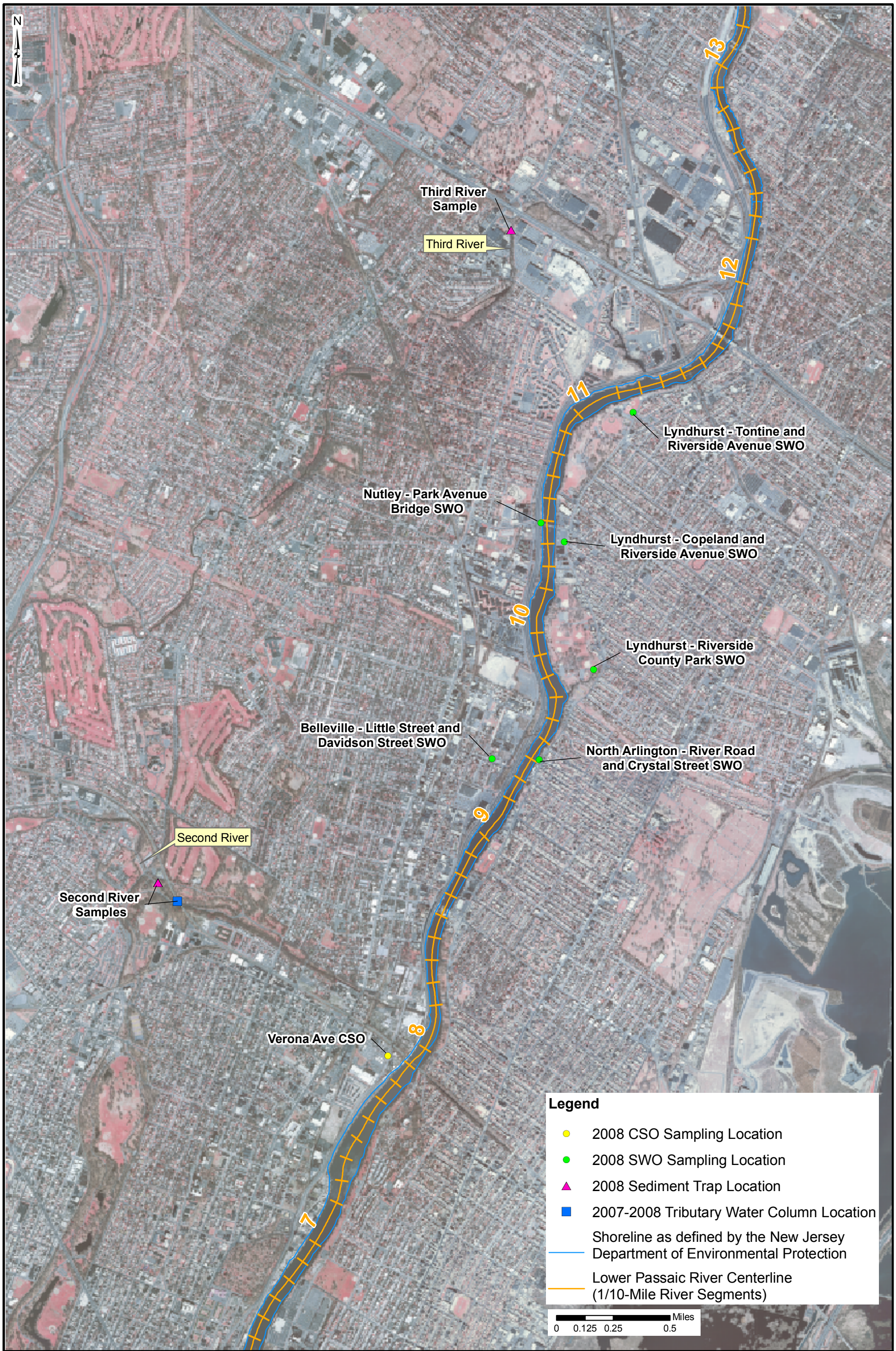

US Army Corps of Engineers

CSO, SWO, Sediment Trap, and Tributary Samples Location for the Water Column Program

Lower Passaic River Restoration Project

Figure 1b

November 2008

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US Army Corps of Engineers

CSO, SWO, Sediment Trap, and Tributary Samples Location for the Water Column Program

Lower Passaic River Restoration Project

Figure 1c

November 2008

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	Sediment Trap *Lower Passaic River Restoration Project*	Figure 2a November 2008

	Sediment Trap *Lower Passaic River Restoration Project*	Figure 2b November 2008

Sediment Trap

Lower Passaic River Restoration Project

Figure 2c

November 2008

	Sediment Trap *Lower Passaic River Restoration Project*	Figure 2d November 2008

	Sediment Trap *Lower Passaic River Restoration Project*	Figure 2e November 2008

Attachment A

Field Parameters Table

Table A1: Tributary and CSO/SWO Water Column Samples - Field Parameters

				Field Parameters (units)										
PREMIS Sample ID	**Waterbody**	**Location**	**Event**	pH	Conductivity (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temperature (°C)	TDS (g/L)	ORP	Salinity	**Total Volume through QMA (mL)**	**Note from GeoSea Consulting, Inc. on Grain Size Analysis**	**Comments**
LPRP-LVCG-SCR-000003	**Second River**	-	1/11/2008	-	-	110	-	-	-	-	-	626	no problems to report with laser	-
LPRP-LVCG-SCR-000006	**Second River**	-	1/11/2008	-	-	-	-	-	-	-	-	-	-	Second TSS sample for LPRP-LVCG-SCR-000003, collected immediately after the completion of the TOPS sample collection.
LPRP-LVCG-THR-000002	**Third River**	-	1/11/2008	-	-	42	-	-	-	-	-	500	no problems to report with laser	-
LPRP-LVCG-SDR-000001	**Saddle River**	-	1/11/2008	-	-	31.8	-	-	-	-	-	500	no problems to report with laser	-
LPRP-LVCG-DDL-000004	**Dundee Lake**	-	1/11/2008	-	-	152	-	-	-	-	-	880	no problems to report with laser	-
LPRP-LVCG-SCR-000004	**Second River**	-	2/1/2008	-	-	122	-	-	-	-	-	-	filtered through 1mm sieve - observed organic material on sieve	-
LPRP-LVCG-THR-000003	**Third River**	Third River Bridge near Wachovia Bank	2/1/2008	-	-	61.4	-	-	-	-	-	-	filtered through 1mm sieve - observed organic material on sieve	
LPRP-LVCG-SDR-000002	**Saddle River**	Bank on the cemetary	2/1/2008	-	-	64.8	-	-	-	-	-	-	no problems to report with laser	
LPRP-LVCG-DDL-000006	**Dundee Lake**	-	2/1/2008	-	-	91.1	-	-	-	-	-	-	no problems to report with laser	
LPRP-LVCG-DDL-000003 (dup for LPRP-LVCG-SDR-000002)	**Saddle River**	-	2/1/2008	-	-	-	-	-	-	-	-	-	no problems to report with laser	TOPS duplicate not collected
LPRP-LVCG-PSR-000399	**CSO#1**	Clay Street Regulator CSO (NW side of Route 21 and Clay Street)	2/1/2008	8.32	0.252	147	12.81	1.97		+189 ORP			no problems to report with laser	
LPRP-LVCG-PSR-000400	**CSO#2**	Verona Avenue Regulator CSO (McCarter Highway and Verona Avenue in front of truck entrance gate)	2/1/2008	8.32	0.252	147	12.81	0.79	-	+169 ORP	-	-	filtered through 1mm sieve - observed organic material on sieve	-
LPRP-LVCG-PSR-000401	**CSO#3**	Saybrook Place/Rector Street Regulator along the Passaic River near a pump station along McCarter Highway)	2/1/2008	7.42	0.234	115	12.65	1.61	-	+176 ORP	-	-	no problems to report with laser	-
LPRP-LVCG-PSR-000402	**CSO#4**	Fourth Avenue Regulator (bottom of Fourth Avenue along Passaic Street)	2/1/2008	7.28	0.194	81.5	10.36	3.07	-	+196 ORP	-	-	filtered through 1mm sieve - observed organic material on sieve	-
LPRP-LVCG-PSR-000405	**CSO#1**	Verona Avenue Regulator CSO (McCarter Highway and Verona Avenue in front of truck entrance gate)	2/13/2008	-	-	-	-	-	-	-	-	-	filtered through 1mm sieve	-
LPRP-LVCG-PSR-000406	**CSO#2**	Clay Street Regulator CSO (NW side of Route 21 and Clay Street)	2/13/2008	-	-	-	-	-	-	-	-	-	filtered through 1mm sieve	-
LPRP-LVCG-PSR-000423	**CSO#3**	Fourth Avenue Regulator (bottom of Fourth Avenue along Passaic Street)	2/13/2008	-	-	-	-	-	-	-	-	-	filtered through 1mm sieve	-
LPRP-LVCG-PSR-000424	**CSO#4**	Saybrook Place / Rector Street Regulator	2/13/2008	-	-	-	-	-	-	-	-	-	filtered through 1mm sieve	-
LPRP-LVCG-PSR-000403	**CSO#5**	Freeman Street Regulator	2/13/2008	-	-	-	-	-	-	-	-	-	filtered through 1mm sieve	-
LPRP-LVCG-PSR-000433	**CSO#4**	Clay Street CSO	3/8/2008	-	-	-	-	-	-	-	-	-	-	-
LPRP-LVCG-PSR-000434	**CSO#5**	Fourth Avenue CSO	3/8/2008	-	-	-	-	-	-	-	-	-	-	-
LPRP-LVCG-PSR-000404	**CSO#6**	Rector/Saybrook CSO	3/8/2008	6.90	0.645	98.5	-	-	0.41	+282 ORP	0.03	-		-
LPRP-LVCG-PSR-000407 (dup for LPRP-LVCG-PSR-000404)	**Dup for CSO#6**	Rector/Saybrook CSO	3/8/2008	-	-	-	-	-	-	-	-	-	-	-
LPRP-LVCG-PSR-000435	**CSO#7**	Freeman Street CSO	3/8/2008	-	-	-	-	-	-	-	-	-	-	-

Table A1: Tributary and CSO/SWO Water Column Samples - Field Parameters

				Field Parameters (units)										
PREMIS Sample ID	**Waterbody**	**Location**	**Event**	pH	Conductivity (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temperature (^{o}C)	TDS (g/L)	ORP	Salinity	**Total Volume through QMA (mL)**	**Note from GeoSea Consulting, Inc. on Grain Size Analysis**	**Comments**
LPRP-LVCG-PSR-000409	**SWO#1**	Lyndhurst (Tontine and Riverside Avenue) - outside Little League Fields	1/11/2008	7.8	0.42	3.5	-	9.04	-	-	-	-	no problems to report with laser	-
LPRP-LVCG-PSR-000410	**SWO#2**	Lyndhurst (Riverside and Copeland Avenue) - new apartment complex	1/11/2008	7.7	0.53	0.0	-	9.7	-	-	-	4,000	-	no water remaining for TSS - no data will be reported
LPRP-LVCG-PSR-000411	**SWO#3**	Nutley (Park Avenue Bridge) - exit 8 under the bridge	1/11/2008	Initial = 7.9 Final = 8.0	Initial = 0.74 Final = 0.33	Initial = 24.1 Final = 304	-	Initial = 7.9 Final = 8.0	-	-	-	-	no problems to report with laser	-
LPRP-LVCG-PSR-000412	**SWO#4**	Lyndhurst (Riverside County Park)	1/11/2008	7.9	0.33	25	-	9.9	-	-	-	-	no problems to report with laser	-
LPRP-LVCG-PSR-000414	**SWO#5**	North Arlington (River Road and Crystal Street)	1/11/2008	8.1	0.40	5.0	-	10.6	-	-	-	4,000	no problems to report with laser	no water remaining for TSS - no data will be reported
LPRP-LVCG-PSR-000416	**SWO#1**	Lyndhurst (Riverside County Park)	2/1/2008	-	-	-	-	-	-	-	-	-	filtered through 1mm sieve - observed organic material on sieve	-
LPRP-LVCG-PSR-000417	**SWO#2**	Belleville - Little Street and Davidson Street	2/1/2008	-	-	-	-	-	-	-	-		no problems to report with laser	
LPRP-LVCG-PSR-000419	**SWO#4**	Lyndhurst (Riverside and Copeland Avenue) - new apartment complex	2/1/2008	-	-	-	-	-	-	-	-	-	no problems to report with laser	-
LPRP-LVCG-PSR-000421	**SWO#5**	Lyndhurst (Tontine and Riverside Avenue) - outside Little League Fields	2/1/2008	-	-	-	-	-	-	-	-	-	no problems to report with laser	-
LPRP-LVCG-PSR-000413	**SWO#6**	Nutley (Park Avenue Bridge) - exit 8 under the bridge	2/1/2008	-	-	-	-	-	-	-	-	-	filtered through 1mm sieve - observed organic material on sieve	-
LPRP-LVCG-PSR-000420 (dup for LPRP-LVCG-PSR-000413)	**Dup for SWO#6**	Nutley (Park Avenue Bridge) - exit 8 under the bridge	2/1/2008	-	-	-	-	-	-	-	-	-	sample contained coarse material blocking instrument valve. Drained instrument - filtered sample through 1mm sieve and then re-processed.	-
LPRP-LVCG-PSR-000425	**SWO#1**	Nutley (Park Avenue Bridge) - exit 8 under the bridge	2/13/2008	6.4	0.22	-	12	1.1	-	-	-		filtered through 1mm sieve	
LPRP-LVCG-PSR-000426	**SWO#2**	Lyndhurst (Riverside and Copeland Avenue) - new apartment complex	2/13/2008	-	-	-	-	-	-	-	-	-	filtered through 1mm sieve	-
LPRP-LVCG-PSR-000418	**SWO#3**	Belleville - Little Street and Davidson Street	2/13/2008	7.0	0.497	120	12.68	0.55	-	-	-	-	filtered through 1mm sieve	-
LPRP-LVCG-PSR-000427	**SWO#4**	Lyndhurst (Riverside County Park)	2/13/2008	6.65	0.394	28.3	12.95	0.92	-	-	-	-	filtered through 1mm sieve	-
LPRP-LVCG-PSR-000432	**SWO**	Johnston Avenue SWO	3/8/2008	-	-	-	-	-	-	-	-	-	-	-
LPRP-LVCG-PSR-000428	**SWO#5**	Little Street SWO	3/8/2008	-	-	-	-	-	-	-	-	-	-	-
LPRP-LVCG-PSR-000429	**SWO#6**	Blanchard Street SWO	3/8/2008	-	-	-	-	-	-	-	-	-	-	-

Table A2: Tributary TOPS Sampling Parameters

			Trace Organics Platform Sampler (TOPS)					
PREMIS Sample ID	**Waterbody**	**Event**	TOPS Flow (L/min)	TOPS Volume (liters)	Number of Filters Used	Water Depth (inches)	Intake Hose	Comments
LPRP-LVCG-SCR-000003	**Second River**	1/11/2008	2.5 - 3.0	25	6 flat filters clogged	-	3 inches from top	-
LPRP-LVCG-THR-000002	**Third River**	1/11/2008	0.48	125	9 flat filters clogged	8	3 inches from bottom	-
LPRP-LVCG-SDR-000001	**Saddle River**	1/11/2008	2.6	100	12 flat filters clogged	36	1 foot from bottom	-
LPRP-LVCG-DDL-000004	**Dundee Lake**	1/11/2008	2.5 - 3.0	51	6 flat filters clogged	-	4 inches from top	-
LPRP-LVCG-SCR-000004	**Second River**	2/1/2008	2.5 - 3.0	68.5	7 flat filters clogged	-	4 inches from bottom	cartridge filter clogged on 7th filter.
LPRP-LVCG-THR-000003	**Third River**	2/1/2008	250 in 7.1 sec	56	6 flat filters clogged	-		-
LPRP-LVCG-SDR-000002	**Saddle River**	2/1/2008	2.5 - 3.0	58.1	6 flat filters clogged	-	6 inches from bottom	-
LPRP-LVCG-DDL-000006	**Dundee Lake**	2/1/2008	250 in 9.5 sec	55	8 flat filters clogged	-	-	-
LPRP-LVCG-DDL-000003 (dup for LPRP-LVCG-SDR-000002)	**Saddle River**	2/1/2008						TOPS duplicate not collected